Systematic review of the effects of schools and school environment interventions on health: evidence mapping and synthesis

CRD summary
This review concluded that available evidence lends broad support to theories of social development, social capital and human functioning and school organisation and generally reported benefits in emotional health and aggression. This was a generally well-conducted review and the conclusions are suitably cautious.

Authors' objectives
To evaluate the health effects of school environment interventions and school-level measures of social and physical environments and their underlying processes.

Searching
Sixteen bibliographic databases – including MEDLINE, EMBASE, PsycINFO, CINAHL and Cochrane Central Register of Controlled Trials (CENTRAL) – were searched from inception to 23 September 2010. Search strategies were reported. There were no language restrictions.

Study selection
The review addressed five research questions about: theories and conceptual frameworks used to inform school environment interventions or explain school-level influences on health; effects of school environment interventions that do not include health education or health services as intervention components; feasibility and acceptability of school environment interventions; effects on health and health inequalities among school students; and processes through which school-level influences may occur. This abstract does not include the summary of the theories and conceptual frameworks and the assessment of the effects on health and health inequalities among school students as these are beyond the scope of DARE.

Quantitative and qualitative studies were eligible for inclusion. Studies need to investigate effects of school social and/or physical environments (and/or underlying processes), interventions to address how schools were led/managed or effects of interventions on health or well-being outcomes of students (age four to 18 years) or staff.

The interventions for the outcome evaluations fell into one of three categories: encouraging staff and students to develop school climates characterised by a stronger sense of community and/or better interpersonal relations to reduce aggression and other risk behaviours; encouraging staff and students to advocate for school environments promoting healthier eating and physical activities; and improving school playgrounds. Feasibility and acceptability studies evaluated encouraging staff and students to develop school climates characterised by a stronger sense of community and better relationships or the enabling of staff and students to advocate for school environments promoting healthier eating and physical activities. Process evaluations used various data-collection methods (such as interviews, focus groups, participant diaries and general observation). Most studies were in USA or the UK in high school/secondary school settings and in disadvantaged communities and families with low socioeconomic status. The most studied ethnic group was African Americans.

After a pilot of 200 abstracts, six reviewers each screened 2,000 titles and abstracts and a random sample of 10% were screened by a second reviewer; a threshold of 20 disagreements per 2,000 references was used to decide whether to establish include/exclude.

Assessment of study quality
One reviewer systematically assessed study quality for all questions using different criteria relevant to the specific review question. A second reviewer checked the accuracy of the assessment. Disagreements were resolved by discussion.

Data extraction
One reviewer extracted data relevant to each review question; extracted data were checked for accuracy by a second reviewer. Disagreements were resolved by discussion.

Methods of synthesis
Studies were combined in a narrative synthesis. Differences between studies were discussed in the text. Study details and results were tabulated.

Results of the review
There were 10 studies of the effects of school environment interventions that did not include health education or services as components: six randomised controlled trials and four non-randomised studies.

Most of the studies had methodological limitations; the quality of the studies was considered to be generally poor, particularly in terms of attrition and adjustment for clustering in the analysis and small sample sizes. Compared to standard practice, interventions that encouraged staff and students to develop school climates characterised by a stronger sense of community and better relationships seemed to show benefits for some but not all health outcomes.

The most methodologically sound evaluation reported the fewest significant benefits. Overall, the authors stated that the studies suggested potential for school environment interventions to bring about benefits, particularly for measures concerned with violence and aggression. There was no evidence of any interventions causing harms.

Two randomised controlled trials of interventions that enabled students to advocate for changes in school catering and physical activity reported benefits for physical activity but not diet. Three evaluations of improvements to school playgrounds offered weak evidence of effects on physical activity.

There were four studies of feasibility and acceptability of school environment interventions. All four studies described their sampling methods, two defined a clear question and all four reported quantitative data; one also reported qualitative findings. Results were mainly positive for process evaluations in terms of intervention feasibility, fidelity, reach and acceptability; differences in methods precluded a comparison of the delivery and uptake of interventions.

There 19 studies of processes through which school-level influences could occur. Fourteen studies were considered high quality. Studies focused on aspects of the school environment that most concerned students, including the physical environment, lack of teacher involvement in pastoral care and outsourcing of discipline to security guards, and new technologies; there was little about how schools were organised and managed and how teaching was delivered.

Schools in which students felt educationally marginalised or unsafe seemed to have increased school disengagement and overall a feeling of lack of safety. A strong positive teacher-student relationship seemed to benefit student well-being and avoidance of risk behaviour. It seemed that organisational features of secondary schools in USA and UK undermined teacher-student relationships so that students felt a loss of control within their school community and this increased the likelihood that they will look for a sense of identity and social support through some of the risk behaviours. The extent to which schools protected and engaged students and ensured that teachers fulfil a broader role in young people's development seemed to be important; there were higher rates of violence, drug use and other risk behaviours where there were socially and economically disadvantaged families and communities, inequities in school funding and high staff turnover.

Authors' conclusions
There was non-definitive evidence for the feasibility and effectiveness of school environment interventions involving community/relationship building, empowering student participation in modifying schools' food/physical activity environments and in playground improvements. Multilevel studies suggested that schools which add value educationally may promote student health. Qualitative studies suggested pathways underlying these effects. This evidence lends broad support to theories of social development, social capital and human functioning and school organisation.

CRD commentary
The review addressed a very broad question supported by reproducible inclusion criteria. There was a comprehensive search for studies. There were no language restrictions. Attempts were made to reduce the impact of error and bias throughout the review process but not all studies were independently screened by two reviewers.
Appropriate quality criteria were used to assess the studies that were relevant for each review question. The review addressed an extremely broad topic area so there were substantial differences between the studies. The decision to conduct a narrative synthesis seemed appropriate.

This was a generally well-conducted review and the conclusions are suitably cautious.

**Implications of the review for practice and research**

**Practice:** The authors stated that to avoid inadvertently increasing inequalities in schooling, as seen with use of league tables, might be for metrics on which schools are judged to focus on measures of the overall performance of students rather than the proportion of students achieving a certain targeted threshold. They stated that school buildings that minimise "unowned" and unsupervised space in school can reduce violence and substance use, and schools which maximise the area for school playgrounds can maximise physical activity.

**Research:** The authors identified several areas of research: empirical research to examine Markham and Aveyard's theory of human functioning and school organisation; studies to address a broader array of school environment factors; trials to examine multiple outcomes and health inequalities; studies to be more informed by theory; studies to examine cost-effectiveness; studies to include process evaluations; studies to examine the effects of intervention components in isolation and in combination; multilevel studies to examine a broader range of exposures and outcomes using more rigorous methods; multilevel models to examine health effects of different school models; multilevel studies to examine the effects of levels other than school; multilevel studies to be informed by theory; qualitative research to examine broader areas of health, settings and aspects of the school environment; and future reviews to examine narrower questions about specific aspects of the school environment and interventions to address these.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract
contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.